NAME: DATE:

# Unit-2 Mastery Assessment (version 604)

**Question 1 (10 points)**

Let $f$ represent a function. If $f[5] = 24$, then there exists a knowable solution to the equation below.

$$y = \frac{f\left[\frac{x-11}{7}\right] + 15}{13}$$

Find the solution.

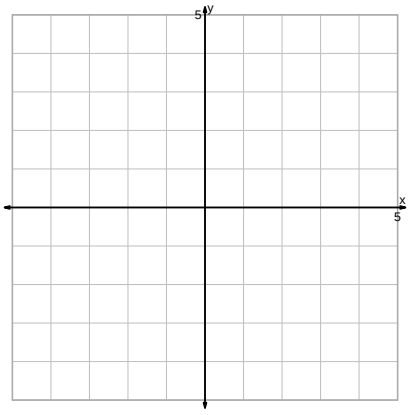
$x =$

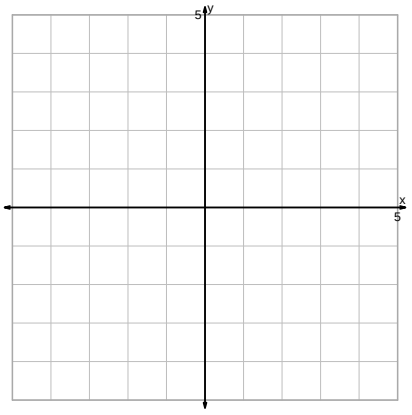
$y =$

**Question 2 (20 points)**

Graph the equations accurately. For each integer-integer point on the parent, indicate the corresponding point precisely. Also, with dashed lines, indicate any asymptotes.

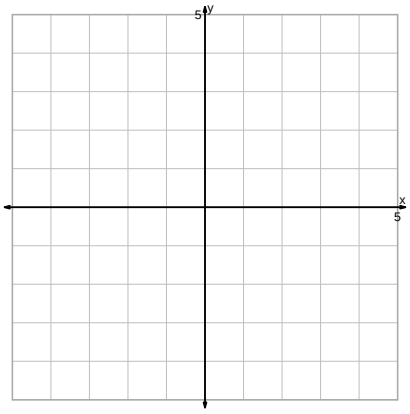
$y = \sqrt[3]{2x}$

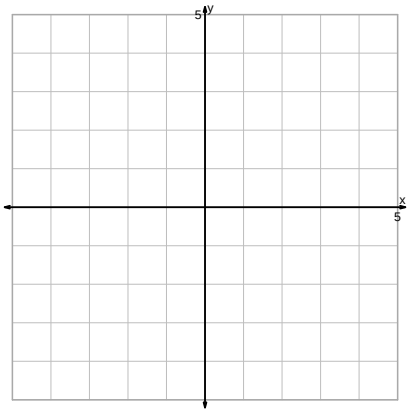



$y = -2^x$

$y = (x-2)^3$

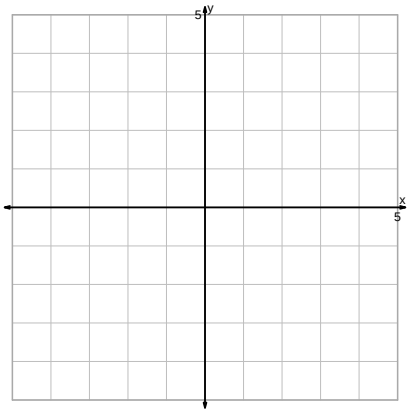


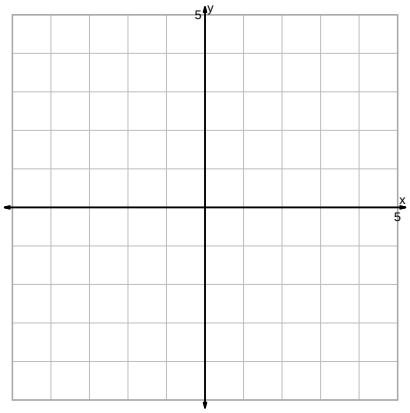




$y = \log_2(x) - 2$

**Question 2 continued. . .**

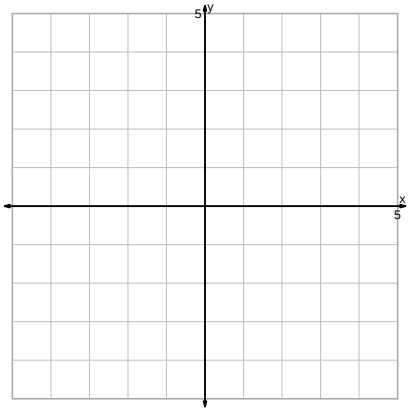
$y = \sqrt[3]{x} + 2$

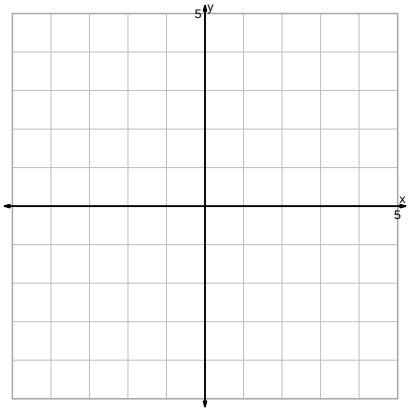



$y = \left(\frac{x}{2}\right)^2$

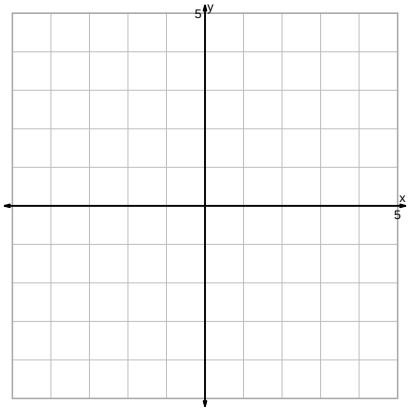
$y = \left(x + 2\right)^3$

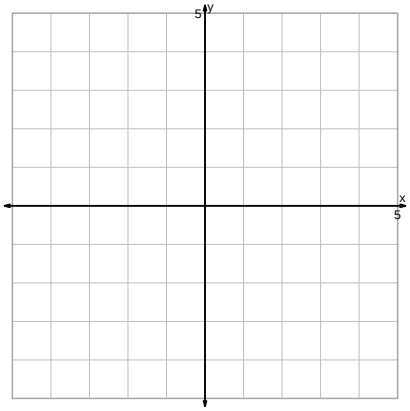



$y = 2 \cdot 2^x$

$y = \sqrt{-x}$

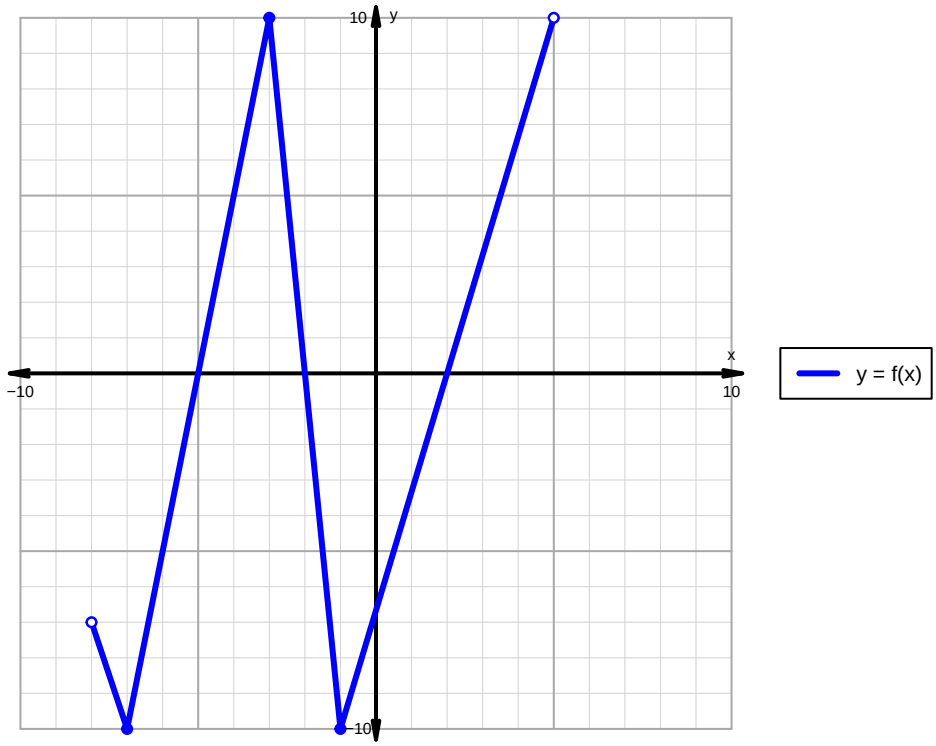



$y = \frac{\sqrt{x}}{2}$

**Question 3 (20 points)**

A function is graphed below.



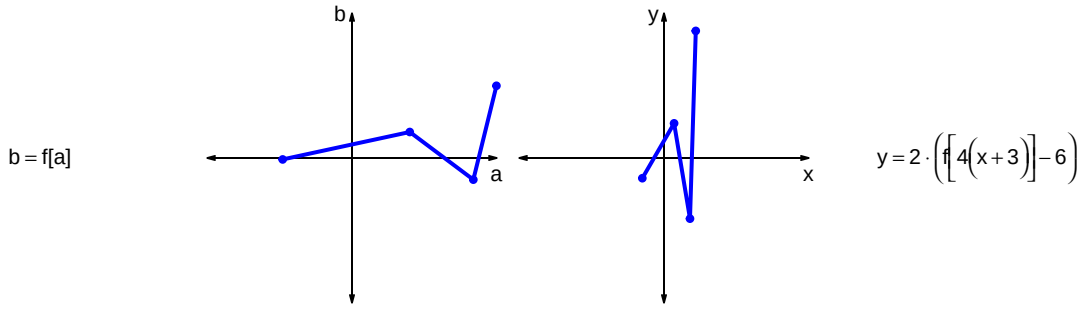

Indicate the following intervals using interval notation.

| Feature | Where |
|---|---|
| Positive | |
| Negative | |
| Increasing | |
| Decreasing | |
| Domain | |
| Range | |

**Question 4 (20 points)**

Let $f$ represent a function. The curves $b = f[a]$ and $y = 2 \cdot (f[4\,(x+3)] - 6)$ are represented below in a table and on graphs.

| a | b | x | y |
|---|---|---|---|
| -48 | -1 | -15 | -14 |
| 40 | 18 | 7 | 24 |
| 84 | -15 | 18 | -42 |
| 100 | 50 | 22 | 88 |




a. Write formulas for calculating $x$ from $a$ and calculating $y$ from $b$. (Or, write the coordinate transformation formula.)

b. What geometric transformations (using words like translation, stretch, and shrink), and in what order, would transform the first curve $y = f[x]$ into the second curve $y = 2 \cdot (f[4\,(x+3)] - 6)$?

**Question 5 (10 points)**

A parent square-root function is transformed in the following ways:

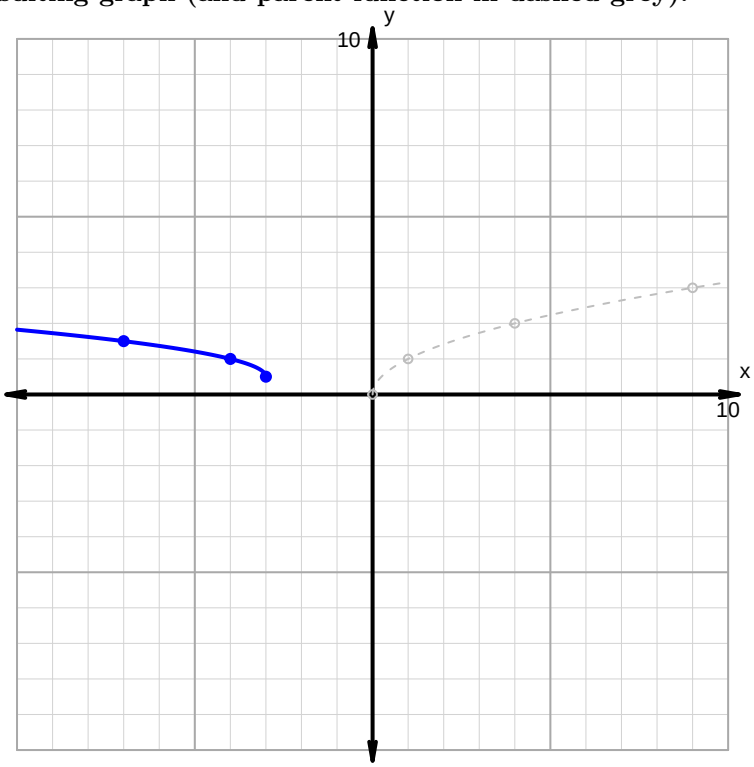
**Horizontal transformations**

1. Translate right by distance 3.
2. Horizontal reflection over $y$ axis.

**Vertical transformations**

1. Translate up by distance 1.
2. Vertical shrink by factor 2.

**Resulting graph (and parent function in dashed grey):**

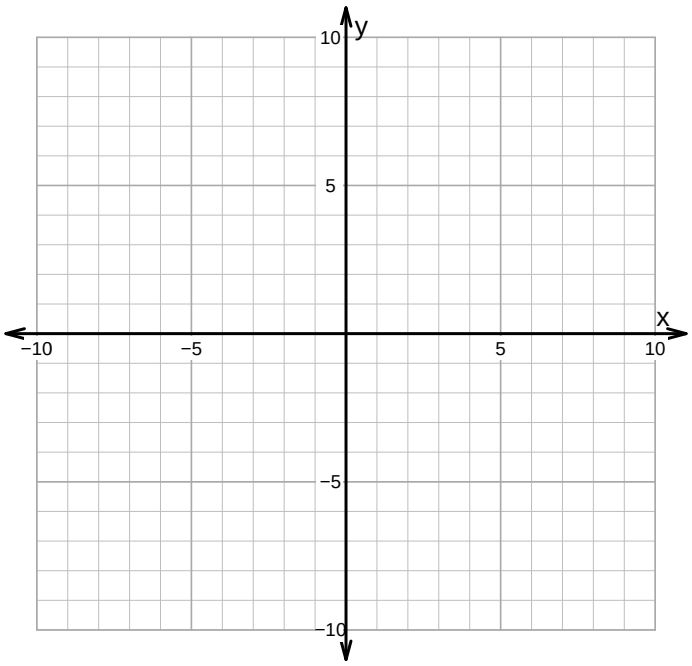



- What is the equation for the curve shown above?

**Question 6 (20 points)**

Make an accurate graph, and describe locations of features.

$$y \;=\; -3 \cdot |x + 6| + 9$$




| Feature | Where |
|---|---|
| Domain | |
| Range | |
| Positive | |
| Negative | |
| Increasing | |
| Decreasing | |